Amendments to the Claims

Please amend the claims without prejudice or disclaimer to read as follows:

Claims 1-35 (cancelled).

36 (currently amended). A method for ~~coating~~ forming a barrier coating on a silicon-based substrate, the method comprising:

depositing a tantalum oxide (Ta_2O_5) layer onto a silicon-based substrate , by electron beam physical vapor deposition, to form a topography such that the tantalum oxide (Ta_2O_5) layer is in the form of columnar grains having gaps therebetween; and

depositing an inorganic layer, by atomic layer deposition, onto the tantalum oxide (Ta_2O_5) layer, such that the inorganic layer is of substantially uniform thickness and is substantially conformal to the topography of the tantalum oxide layer to thereby form said barrier coating.

37 (original). The method of claim 36, further comprising depositing a bonding coat onto the silicon-based substrate, by atomic layer deposition, before depositing the tantalum oxide (Ta_2O_5) layer.

38 (original). The method of claim 36, wherein the inorganic layer is selected from the group consisting of aluminum oxide (Al_2O_3), tantalum carbide (TaC), hafnium oxide (HfO_2), mixtures thereof, nano-laminates thereof, and alloys thereof.

39 (original). The method of claim 36, wherein the inorganic layer is selected from the group consisting of silicon carbide (SiC), silicon nitride (Si_3N_4), oxycarbides, carbonitrides, mixtures thereof, nano-laminates thereof, and alloys thereof.

40 (original). The method according to claim 36, wherein the silicon-based substrate is one of a silicon nitride substrate and a silicon carbide substrate. therefore requested that at least Groups III and IV be examined together.

Claims 41-49 (cancelled).

50 (new). The method according to claim 36, wherein the barrier coating preserves the gaps between the columnar grains of the tantalum oxide layer to thereby prevent sintering therebetween.